

tion or bowel obstruction, gastric lavage should be performed before the patient is asleep, not during the course of the anesthetic.

Pre-existing pulmonary lesions should be carefully searched for, and a patient with any infection of the respiratory tract should not be given a general anesthetic if it can be avoided. The anesthetic should be given with such skill as to maintain even muscular relaxation, preventing the return of the pharyngeal reflexes during the operation, and preventing cyanosis, whenever this is possible. The position of the patient during operation favors a stormy postoperative convalescence in many instances. The use of pillows, sand-bags, and other apparatus is frequently demanded by the surgeon, that he may secure a better exposure of his operative field. The use of such apparatus should be discouraged whenever it will interfere with the movements of the diaphragm or the aeration of the inferior lobes of the lungs. To have the patient in a sitting position during general anesthesia is an almost criminal procedure. The position of choice is a slight Trendelenburg's position. Suction should be used to prevent aspiration during all operations on the mouth and throat. The patient should not be chilled or exposed to cold air during or for several hours after an operation.

The surgeon should not begin his operation before the patient is properly anesthetized. He should be gentle in his manipulations and in handling the tissue. All measures to prevent wound infection should be vigorously enforced to limit the chances of venous thrombosis. Intelligent postoperative care and observation may prevent the dislodging of a thrombus.

Such procedures as I have suggested are not new, but are frequently overlooked or carelessly observed, and they require cooperation between the anesthetist and the surgeon. The more the surgeon knows about the art of giving an anesthetic, and the anesthetist knows about the patient's disease and general physical condition, the more effective will be this cooperation.

CONCLUSIONS

1. Postoperative pulmonary complications are frequent, and they may be severe.
2. Such complications occur after operations under local anesthesia as well as under general anesthesia.
3. There is no single cause of all postoperative pulmonary complications, but the possible causes have been reviewed.
4. The prevention of all postoperative pulmonary complications seems impossible, but measures which might lessen their frequency have been suggested.

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THE SUPERVISION OF DIAGNOSTIC LABORATORIES

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INCREASING attention is being given in different states to the need of some sort of supervision of clinical and public health laboratories. Realization of this need was first appreciated or at least first manifested by official public health agencies. The health department of New York State was the first to inaugurate a system of laboratory control, and California was, I believe, the second in line, with the action of the State Board of Health in 1923 in authorizing the Hygienic Laboratory to initiate a system of voluntary certification.

The need for protection of the people and their physicians and health departments against a low standard of service in this important field is evident to every competent laboratorian and to every physician who is himself sufficiently in touch with laboratory methods to recognize ignorance and charlatanism when it appears in the guise of diagnostic laboratory service; for there are charlatans in diagnostic laboratories as there are in the general field of medicine.

METHODS OF SUPERVISION

The only difference of opinion likely to arise concerning this subject is in the matter of how supervision should be brought about; whether by legislative enactment or by exercise of general powers by some official body having such general powers as the Board of Health, or by a system of voluntary cooperation on the part of the laboratories with some self-appointed central source of control such as the Board of Health, other state commission, or the laboratories themselves. Another alternative would be to leave it to the slow process of natural evolution through growing understanding on the part of physicians and an awakening consciousness of responsibility on the part of the laboratorians. If it were the regulation of the practice of medicine that was being considered it goes without saying that the last method would be generally accepted by nobody but the charlatans themselves. Why physicians should not apply to their laboratory workers the same reasoning regarding the necessity of adequate education and experience that they apply to themselves, is something of a puzzle. It is doubtless to be explained by lack of thought and attention that is given this specialty of medicine by the profession in general. Whatever the explanation, it is a fact that less concern is shown by the average individual physician in routing his specimens to a laboratory and by the average group or hospital in employing a laboratorian than to almost any other type of service they make use of. The influences that determine the physicians' choice are, without question, generally the same that influence patients in selecting their physicians. For some the sign on the door is sufficient or the statement of the applicant for a job that he or she is a bacteriologist, or that he or she is fresh from the laboratory of some "hospital." True, the former job may have been that of dish washer, but this is ordinarily not gone into. Others may be more cautious; they may require the recommendation of someone else no more qualified than

they to decide on the technical qualifications of the seeker after employment or referred business. A few will pursue the course adopted by a very few patients in choosing their physicians; seek the advice of someone who has special knowledge in that particular line. Such things as personal appearance, convincing manner, a line of "patter" suggesting technical knowledge, a pleasing personality, are just as effective in "selling" the laboratorian to the physician as in "selling" the physician to the patient.

TRAINING STANDARDS OF TECHNICIANS

The obvious remedy for such a situation is enlightenment of physicians and others patronizing laboratories or employing laboratory workers to such facts as these:

1. A technician cannot secure competency by working in *any* laboratory for a period of two months or four months or six months.

2. An education in the basic sciences of chemistry, bacteriology, biochemistry and pathology is even more necessary than for the practice of medicine.

3. Experience under competent supervision is necessary even after the best of college courses.

4. The statement of an individual regarding his qualifications or the recommendation of an acquaintance who is not himself a specialist in the laboratory field is not a safe way to decide.

5. The average physician, health officer or hospital executive is not prepared to pass on the qualifications of a laboratorian and, therefore, must have some method of distinguishing the competent from the incompetent.

6. If it were possible to have a thermometer that reversed the temperature readings, a stethoscope that announces rales when there are none, or a pleximeter that gives forth a hollow sound over an area of pulmonary consolidation, the consequences would be serious, but not more so than reliance on the laboratory work of some persons, who find no difficulty in making a living as clinical laboratorians.

When the realization of such facts becomes enough, some form of official control of laboratories or licensing of laboratory workers will be demanded by the medical profession. Perhaps before that time the better laboratories will themselves have initiated the movement. Until that time it seems incumbent on those having a knowledge of the facts and who are at the same time in a position to improve conditions, even in a limited way, to take such action as their judgment dictates.

PRESENT PLAN OF CALIFORNIA CERTIFICATION

In line with this conception of their duty as guardians of the public health, the California State Board of Health initiated in 1923 the existing plan of laboratory certification, and the result has been very gratifying. There are at the present time sixty-one laboratories in the state that have been inspected, approved and have had certificates issued to them.

In the operation of this division of the work, an application for certification is followed by a personal visit to the laboratory by the director of the State Hygienic Laboratory. The applications are made in writing on a special form provided by the department. In this application, questions are answered regarding educational qualifications and experience of the director, the number of employees, the physical equipment of the laboratory, types of work performed, etc. The applicant also agrees to keep careful records of work done, including the pres-

ervation of certain stained slides for a definite period, and to submit to inspection as required. It has not been considered necessary or advisable to require particular methods of examination, but if the method in use is not considered a safe or effective one, approval for that particular examination is withheld, unless an approved method is adopted.

Under the regulations of the board, the director of a laboratory, if not the owner, must have full authority to control the policy of the laboratory, so far as technical matters are concerned. The records that are required to be kept are those pertaining to the examination of specimens, such as results, name of patient, who submitted the specimen, etc. The recording system must also be such that any particular slide can be readily found and connected up with the case. Financial matters, fees for examinations, etc., are not inquired into. Changes affecting the directorship, removal of laboratory to new location, radical changes in technique and discontinuance of tests previously approved must be reported to the director of the Hygienic Laboratory. Certificates are issued to the responsible head of particular laboratories and do not apply to other laboratories even when under the same management.

ULTIMATE SOLUTION OF THE PROBLEM

The writer believes that while the present system of voluntary certification is having a good influence, principally educational, and has resulted in several specific instances in improving local laboratory service materially, the ultimate solution of this problem rests in state regulation of the qualifications of laboratory workers. This is really more important than the insurance of competence in laboratory directors. A technically competent director may not always be a good administrator, and this is something against which no system possible can ever insure. Political influences in municipal laboratories may interfere with the freedom of choice of workers and in private laboratories the necessity of making the business pay, influences the salaries paid and the quality of service received.

The approval of laboratories by the American Medical Association is a step in the right direction, but excellent as it is, and useful as it undoubtedly will become, it is only a step and only applies to commercial laboratories. Like the California plan, its chief advantage will be educational, but it is nation-wide in scope, a distinction that establishes it as a useful institution regardless of any possible development of perfection in state methods.

IN CONCLUSION

We should, in short, have a standardization of the workers, not the institutions. Administratively, the licensing of workers could be placed under the Board of Medical Examiners, the Board of Health or a special board, or under the department of education. Presumably any such board would, even if this were not provided for in the legislative act, employ experts in the various lines of laboratory work to pass on the credentials of applicants for registration. Since the sciences concerned in diagnostic laboratory methods are among the basic medical sciences, it would seem reasonable to regard such laboratories as practicing a specialty of medicine, and

their regulation, therefore, as coming under the supervision of the medical licensing authority. However, the fact that the State Board of Health of California already maintains a laboratory bureau and has already taken cognizance of the situation makes the placing of the licensing of laboratorians under that division of the state government a reasonable plan for California. Such details naturally will be worked out differently in different states; the essential thing is the examination and licensing of individuals rather than institutions. Different classes will, of course, be necessary, covering different kinds of work, knowledge of which is not always combined in the same individual. Cellular pathology, biochemistry, bacteriology, serology, immediately suggest themselves as separate divisions, and applicants would apply for one or more certificates, according to their training and experience.

The problem is up to the medical profession and laboratory directors, and it is inconceivable that opposition can come from any but those having reason to fear the operation of such a measure.

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ANESTHESIA IN UROLOGIC SURGERY*

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THE choice of anesthetic in urologic surgery is a matter of concern to the internist, surgeon and anesthesiologist and has been the subject of much discussion and investigation in the past few years. That ether and chloroform inhibit kidney function is a well established fact, explained by Cushny as being due to the reduced blood pressure and impaired aeration of blood.

USE OF MORPHIN AND ATROPIN

The great progress that has been made in the development of local anesthesia makes it the ideal method for the selected patient but for the large proportion of cases, where general anesthesia is necessary, nitrous oxide best meets the requirements of urologic surgery. Unlike ether and chloroform, it has no effect upon blood pressure, other than to cause a rise during secondary saturation when the oxygen percentage is reduced. As nitrous oxide is not eliminated by the kidneys, its obvious advantage has caused it to be the anesthetic of choice in most urological clinics where a general anesthetic is indicated. The question, therefore, of withholding the preliminary morphin, which influences so strongly the course of nitrous oxide anesthesia, becomes a matter of great interest to the anesthesiologist.

The work done by Haines and Milliken in the Surgical Research Laboratory and the Department of Urology, Graduate School of Medicine, University of Pennsylvania, on the subject of the renal effects of morphin and atropin with ether anesthesia, suggested a comparison with the results under nitrous oxide and oxygen. Seeking in their experiments to obtain a criterion of the operability of pathologic cases, functional tests with intravenous

indigo carmin were made, with and without morphin and atropin both appearance time and elimination being estimated, the latter being measured at three twenty-minute intervals. The results of these tests in six typical cases proved that elimination was slightly better after the injection of morphin and atropin as shown by appearance test and percentage of dye eliminated.

A series of six dogs were injected intravenously with indigo carmin after thirty minutes of deep ether anesthesia, the etherization being then continued. Twenty minutes was the earliest appearance of the dye. The same dogs a week later were given morphin and atropin half an hour before etherization and the appearance time was four and five minutes, which was as soon as in the control cases and normal unanesthetized dogs. They conclude from these experiments that morphin and atropin in the usual hypodermic dose does not affect the kidney function unfavorably and that in dogs it prevents the inhibition produced by ether. Because of the supposed retardation of urinary secretion produced by morphin and atropin, it has been customary to omit it in cystoscopies and ureteral catheterizations under nitrous oxide. This investigation was undertaken to determine whether nitrous oxide anesthetization inhibited kidney function and if so whether morphin and atropin prevented this inhibition, as in the case of ether.

Cystoscopies in adults are usually done under some form of local anesthesia but here again the preliminary morphin would be of great value for the preoperative psychic effect and postoperative relief from pain, if it proves not to interfere with kidney function. Morphin is frequently the determining factor in the possibility of obtaining muscular relaxation under gas anesthesia and if, as Haines and Milliken suggest, it does not interfere with elimination, then urologic operations, which contraindicate ether and where complete muscular relaxation is necessary, such as perineal and supra pubic prostatectomies, nephrectomies and operations on the bladder, as well as cystoscopies and ureteral catheterizations, may be done under nitrous oxide without the addition of ether.

The evaluation of the preoperative use of morphin in general surgery is still a matter of controversy. That anesthesia is immeasurably benefited by its circulatory sedation, muscular relaxation, control of mucus production and the prevention of apnea, due to psychic effect and slowing of respiration, is generally accepted.

One of the outworn traditions, that of its danger to children, is being gradually discarded. In the Children's Hospital, morphin and atropin, in properly graded dosage, is given almost as routine before tonsillectomies and, covering a period of thirty years, the records show no fatalities. Formerly, two years was the lowest age limit for nitrous oxide, even for induction, with the gas ether sequence, but the increasing number of infants and young children in whom cystoscopies for diagnostic purposes were found necessary, led to the use of gas. Time is an important element in the safety of anesthesia in infants and the difficulty of ureteral catheterization, with the occasional necessity for repetition at short

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